

## Book review

Johan Wagemans, *The Oxford Handbook of Perceptual Organization*. Oxford, UK: Oxford University Press, 2015. £120. ISBN 9780199686858.

**Reviewed by:** Andrew Mark Herbert , Rochester Institute of Technology, Rochester, NY, USA

I think of a handbook as something (a) concise, portable, and analogous to a manual or user's guide or (b) a weighty tome that sits on a shelf to be consulted on occasion when I have a particular question (or more frequently, when a student has a question). I think the latter matches up well with the definition recently described by Geoffrey Hall in a review of another Handbook in this journal. *The Oxford Handbook of Perceptual Organization* definitely falls in this second category. I was provided access to the online version, so I'll describe the interface first then review the content in broad strokes.

### Format, usability, and summary of the handbook structure

The online version is accessed through the Oxford University Press Handbooks website (<http://www.oxford-handbooks.com/>) and comprises links to each chapter from the table of contents. Once one is "in" a chapter, navigation follows that of any webpage. Unfortunately, the figures are presented in a small format, and expanding them to get a better view is clunky. When viewed as PDFs, many of the figures are small, and can't be magnified. Page numbers from the printed version are indicated on the PDFs, but these aren't seen online. One feature of online access is that when reference is made to another chapter in the handbook one can follow a link to the beginning of that chapter (although some links don't work). Likewise, when an author makes reference to another section in a chapter a clickable link is provided. Citations are clickable links that jump one to the relevant part of the reference list. Returning to the section one was reading requires use of the "back" command in one's web browser. Unfortunately, none of this works in the PDFs. Thus, navigation of the handbook online has some advantages over hard copy. I printed chapters and read them because navigation of the website, and reading on screen are not to my liking. Reading directly from the Handbook website is probably best for those lim-

ited to electronic access (which is becoming more common as library expenses increase).

The handbook is divided into 10 sections from general background to topics in perceptual organisation we expect to see and the last section covers relevant theoretical approaches. Each section comprises 3-8 topics in separate chapters. These chapters are not numbered in the contents online, but the figures are numbered chapter by chapter. Each chapter is preceded by an abstract, and the content is followed by a complete and extensive list of references. There are many multi-authored chapters and a few cases where someone has written more than one chapter. Unfortunately, it's not always clear what material is related in the other chapter and there's no reference to the relevant page numbers. That may impede a relative novice attempting to piece together the whole story from the various inter-related chapters.

A final comment on the handbook organisation etc. relates to the writing. The variety of experts writing chapters leads to ebbs and flows in the readability. This is to be expected. Unfortunately, some authors are not native English speakers and those chapters can be difficult to follow at times. Odd sentence structure and the use of peculiar terms or phrases decrease the readability of the text. Perhaps the editor (not a native speaker of English) or publisher could have done more for the reader.

### Some comments on the content

I haven't read the entire handbook. I read all of Section 1 (General Background), Section 2 (Groups, Patterns, Textures), and then various chapters of interest to me in the rest. I suppose I read about half the Handbook including some chapters I skimmed. I've published on symmetry perception, so of course I read relevant chapters. I read the chapters written by people I know, or have heard at conferences, or whose work I've enjoyed in the past. I wanted to find out what I'd missed in areas I think I know better and also read topics new to me (or that I should know already) to determine how the handbook serves both an expert and relative novice.

The chapters can be characterised as review articles with extensive coverage of the material related to the expertise of the chapter author. That is, there may be other published material on the topic, but we get a thorough

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review of the chapter author's views and publications on a topic as it relates to perceptual organisation. Unlike many edited volumes, there is no synthesis provided spanning multiple chapters. There are no chapter or section summaries. Each chapter stands on its own, and I imagine that's part of the reason for calling this a handbook.

I read the chapter on "Symmetry Perception" with keen interest, and this led me to van der Helm's later chapter on "Simplicity in Perceptual Organization." I thought there could be more coverage of anisotropies and their antecedents in early vision, but there is a thorough overview of symmetry as one of the perceptual grouping phenomena. Brooks' review of the principles of perceptual grouping is well-written and thorough (and full of useful figures) and is complemented very well by the "Texture Perception" chapter by Rosenholtz (and others like that of Pomerantz and Cragin). Dakin, Peterson, and Elder all gave thorough reviews of their relevant areas of expertise that I enjoyed. The chapter by Osorio and Cuthill on "Camouflage and Perceptual Organization in the Animal Kingdom" excelled both in terms of the application of the principles of perceptual organisation shaped by evolution and its links to human efforts at camouflage (such as Behrens' work). It made me want to learn more about the visual systems of predators.

In sum, I learned some new things, and put others into a different context. I think this would be an ideal choice for a graduate student with some knowledge of perception or a postdoc moving into a new area or looking for a resource to cover much of the material on vision at the "intermediate" level. Retinal processing and "early" vision are covered in passing (although exceptions include chapters by Dakin; Hess, May & Dumoulin; and, Self & Roelfsema). Some of the later chapters cover face perception, perceptual organisation in art, cross-modal perception and other "higher" level vision. Various chapters refer to these artificial divisions and how little we know about what occurs after light is transformed by processes in the retinogeniculo-striate pathway.

The handbook serves as a summary of modern thinking on topics related to the classical Gestalt laws and observations. Many chapters examine the effects of proximity, similarity, symmetry, and so on in relation to different

topics like texture perception, contour integration and other aspects of "2-D" stimuli. There is a lot of material examining how dots, blobs, discs, and the like are aggregated. Most chapters stop short of how these aggregations are perceived as meaningful or familiar objects or scenes. Some chapters focus on neural responses related to perceptual organisation, but the inputs remain incomplete shapes, isolated faces or objects, and other impoverished stimuli. Authors mention context, but there is little on how we perceive objects and scenes outside the laboratory or with "real-world" situations. For example, Anderson starts his chapter addressing questions about real-world lightness perception, but describes effects on discs, graphics and isolated stimuli. Elder's chapter is similar, in that we start with discussion of perceiving the real world, but quickly move to image processing and the models of good continuation, proximity and so on. Symmetry perception as it relates to dot patterns and figure-ground segregation is well covered (along with simplicity), but there is no extension to the complications of detecting symmetry in scenes or how detecting symmetry may play a role in object recognition (as suggested by Marr and others).

I can look out my office window on a winter's day, seeing large expanses of white snow, trees, bushes, some cleared walkways and a Henry Moore sculpture. Another brick building is in the background. I have read much of the book with this landscape visible and the qualia of this scene are not captured by what I've read in the book. There are visible textures, but nothing like the dots, discs, stars, incomplete squares etc. that make up the stimuli for much of the research discussed in the handbook. Perhaps this is one of the challenges of studying perceptual organisation: we experience the output of a system that may rely on much of the processing described in the various chapters and evident in laboratory studies but we have no sense of these operations. Regardless, I found much of the content stimulating, and much information is reviewed and will serve the reader wanting a snapshot of the state of knowledge on these topics in the early 21st century.

#### ORCID iD

Andrew Mark Herbert  <https://orcid.org/0000-0003-2645-7888>